BODY & SOUL

Allergies May Be the Price for Conquering Other Diseases

Why We Sneeze

BY MARK SCHOOFS

El Niño is blowing in an early spring, and millions of people are already sneezing and wheezing. One in six Americans suffers from allergies. The annual cost in medication and lost work exceeds $10 billion. And asthma, the worst of the allergic diseases, kills 5000 Americans every year. Indeed, allergies are so common that they beg a question: Why does the immune system react so violently to substances—such as pollen, mold spores, and animal dander—that have been in our environment for eons? Why do allergies exist?

That is one of the most baffling mysteries in medicine. After all, until the invention of antibiotics, surviving childhood was a Darwinian struggle. Allergies—which trigger sinus infections, bronchitis, and even pneumonia, as well as causing asthma—are a major liability. So why didn't they land in evolution's trash heap?

Perhaps because they are not a liability at all, but an asset. That's true for other diseases. The mutation that causes sickle-cell anemia, for example, protects against malaria. Could allergies do something similar? Well, maybe not the inflammation of the nose and bronchial tubes, or the sneezing and runny nose. But the biomolecular cause of those symptoms may very well protect against something that, until this century, was endemic among humans: intestinal parasites.

The molecular basis of both allergies and the immune response that fights parasites is very similar. Both are orchestrated by an immune-system master molecule called immunoglobulin E, or IgE. This February, stronger evidence emerged when researchers studying poor children in Venezuela revealed that kids with allergic IgE responses had less severe parasitic infections. The Darwinian advantage in suppressing the parasites compensates for the burdens of allergic disease, the researchers theorized.

ANOTHER, MORE PROVOCATIVE hypothesis is that allergies are the price we pay for medicine's victory over parasites and bacteria. Australian researcher R. G. Bell has noted that for nearly all of human evolutionary history, helminth parasites were as common as colds. "Only in the last 100 years or so have people living in areas of high development with sophisticated water and sewage systems been able to escape helminth infection. Allergies are as conspicuously present in these human populations as they are absent in populations that are still regularly exposed to helminths."

Bell and others believe that allergies don't help fight parasites at all. Instead, allergies are what happens when the immune system is freed from fighting disease. After all, the human immune system evolved expecting to be locked in lifelong combat with parasites; remove them and it goes awry. It's almost as if, lacking the opponent it expected, the immune system ends up attacking harmless things, such as pollen or dust mites.

In fact, early exposure to known allergens greatly increases the odds that a person will develop serious allergies. Some evidence even suggests that fetuses can develop allergic immune responses in the womb. In the past, infants would have been exposed to parasites and bacteria, and their immune systems would have developed accordingly. Now, one of the best things parents can do, especially in New York, is keep their children away from cockroaches. Kids exposed to lots of cockroaches are three times more likely to develop asthma than those who don't encounter the critters.

Parasites may not be the only disease that can divert the immune system from allergies. A study from Japan found that kids who have been exposed to tuberculosis are less likely to get asthma, and they have lower IgE levels. And an Italian study found that adults who had been exposed to hepatitis A were less likely to get allergies. Several teams are using these clues to develop a kind of allergy vaccination: They are injecting people with benign bacteria, or harmless fragments of disease-causing bacteria, to try to prompt the immune response that suppresses allergies. Early results look promising.

IF ALLERGIES ARE THE PRICE of defeating other diseases, that would help explain one of the most puzzling facts in medicine: the shocking rise in asthma. This allergic disease was extremely rare until the last century, and it is still rare in the Third World, where, of course, parasites and bacteria rage.

But even if this theory turns out to be true, allergies would still present a mystery. For example, how to explain the fact that the asthma rate has doubled in the U.S. since 1980, even though clean water has been around for much longer? And why is asthma worse among America's poor, where allergy-averting diseases are more common, while in other countries, wealthy people are just as likely to have asthma? Still, economic development has radically altered the environment our immune system evolved to encounter. Would it really be so surprising if it's gone haywire with hay fever? V

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What Is To Be Done

Pollen is bad, but indoor allergens can be worse. Here are some steps to take:

- **Encase bedding in airtight, dust-proof covers.**
- **Wash bedding in water hotter than 130 degrees.**
- **Remove carpeting, especially in bedrooms.**
- **Do not use fans.**
- **Professionally exterminate cockroaches.**
- **Don't leave food or water standing for roaches to eat.**
- **Remove mold in bathrooms and kitchen; repair water leaks.**
- **Install a high-efficiency particulate air filter.**

Source: National Institute of Allergy and Infectious Diseases